



**BRIEFING: AUGUST 2013 BOARD MEETING AGENDA ITEM #7**

**TO:** Chairman Richard and Board Members

**FROM:** Jon Tapping, Risk Manager

**DATE:** August 1, 2013

**RE:** Proposal to Adopt a Policy and Procedures for Contingency Management on Construction, Design-Build, and Design-Build-Operate Contracts

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**Introduction**

At its June 2013, meeting, the Board approved the award of the design-build contract for Construction Package 1. The procurement process for subsequent construction packages will commence in the near future. The purpose of this proposal is to establish this Board's policy and procedures pertaining to the establishment and use of contingencies on Construction, Design-Build, and Design-Build-Operate contracts.

**Background**

The Association for the Advancement of Cost Engineering (AACE) defines a construction contingency as an estimated dollar amount to allow for items, conditions, or events for which the occurrence or effects are uncertain but which experience shows will likely result, in the aggregate, in additional costs. For public works projects, a budget contingency is typically included to cover the cost of work deemed likely to be necessary in order to accomplish the defined scope of the contract, but which cannot be defined or specified with the precision necessary to be a biddable cost. Contingencies are not intended to provide for scope increases or extraordinary events such as strikes or natural disasters.

For example, subsurface geotechnical conditions as well as structures and conditions within buildings that cannot be accessed prior to contract award are circumstances in which precise specifications cannot be given in the bid documents. Projects which have extensive right-of-way and utility relocation requirements or which involve first-of-their-kind methods also involve uncertainties which, while known to exist in the general sense, cannot be specified with a level of precision necessary to support bid documents.

At its most basic level, contingency may be thought of as the extra amount of fuel in your gas tank over that which is theoretically necessary to complete a trip; the extra amount offers the driver flexibility to complete a trip in the event of heavy traffic or minor detours without having to stop to refuel or, worse, stall out. Contingency provides a level of protection to the project budget that allows for the successful completion of the project in the face of uncertainty and risk,

allowing the project manager to respond to probable, if not precisely quantifiable, variations in the project cost in a timely manner to keep the project moving forward.

Public agencies which regularly deliver public works projects use different approaches to establishing the contingency amount on a project. There are three primary methods for establishing the contingency amount:

1. Expert judgment based on an assessment made by the Project Manager and staff; typically used for small, straightforward contracts but not reasonably applicable to a large, complex project such as California High-Speed Rail Program.
2. Guidelines or policy that are pre-established by the owner or public agency – most appropriate when similar projects are repeatedly executed, providing a strong case history to establish appropriate contingency as percentage of contract value
3. A risk-based computer simulation analysis such as “Monte Carlo” analysis that includes probable events (project specific risks and known-unknowns) impacted by project conditions and/or constraints – applicable singly or in combination with method #2 for large, complex projects without adequate precedent to justify application of a flat percentage without further analysis

Agencies with long histories of repeatedly delivering similar projects often use a standard percentage contingency with possible adjustments to account for the complexities or circumstances of a particular project. Examples of this approach are as follows:

- Caltrans applies construction contingencies of 10% with the approval of the Chief Engineer.
- The Federal Highway Administration (FHWA) guidance allows contingencies in the range of 5% to 15% with contingencies in the higher end of the range on longer duration projects, NEPA-entitled projects, or projects involving extensive right-of-way acquisition, utility relocation or railroad interface.
- The Federal Transit Administration (FTA) permits a contingency of 30% during Preliminary Engineering, and 15% upon full funding of construction.
- On a recent design-build mega project, the Los Angeles County Metropolitan Transportation Authority (LACMTA) stated that a contingency up to 30% could be justified when third party utilities and right-of-way acquisition were extensive.
- SamTrans (Caltrain) authorizes its CEO to issue changes orders, the equivalent of a contingency, up to 10% of the contract value.
- The Southern California Regional Rail Authority (Metrolink) uses a standard 10% contingency.

Large, complex projects or projects without adequate precedent to determine a ‘standard’ or recommended contingency, require specific study of the given project’s scope, context and contractual agreements to determine particular circumstances or events – risks – that may result in cost increases. Broadly, the development of a risk informed contingency involves the systematic identification, quantification and analysis of risks particular to the project and its circumstances to determine the appropriate contingency level. The project’s scope of work,

current status and delivery method are reviewed to identify those specific issues which have a reasonable probability of resulting in cost increases to the project. These issues are quantified for probability of occurrence and potential cost impact.

These quantified risks are then collected and serve as inputs to a Monte Carlo simulation to determine the possible cost outcomes as well as the probability (likelihood) of these outcomes. The use of Monte Carlo simulations to assess risk is a widely accepted industry practice and is supported by the U.S. Government Accountability Office (GAO), the California Bureau for State Audits (BSA), and the Federal Railroad Administration (FRA).

The advantages of using a risk-informed approach as opposed to a flat percentage are three-fold:

1. *Overall recommendation is made with reference to the specific project, context and contractual arrangements:* Lacking historic precedent set by repeated execution of similar projects, the methodology provides a systematic means for identifying the overall contingency appropriate to meet the challenges and issues specific to the Project.
2. *Transparency:* a risk-informed approach results not only in a better understanding of the contingency appropriate for the specific project overall but also what it may be used for, providing information about the specific issues that may result in cost overruns.
3. *Establishes levels of confidence:* the risk based approach and its employment of Monte Carlo simulations provides information about the level of confidence (probability of sufficiency of contingency) that such assigned contingency provides. This probabilistic assessment of project risk provides a means for establishing project budgets with varying levels of confidence against cost overruns that is verifiable and supportable.

The contingency itself is an acknowledgement of, and insurance against, the potential adverse effects of unmitigated risks. The same methodology would be repeated to manage the changing risks throughout the life of the project, and thus provide justification for adjusting future contingency needs.

### **Discussion of Issues before the Board**

#### **Establishing Construction Contingencies on First Construction Segment Design-Build Projects**

As the Authority enters the construction phase of the High-Speed Rail program, it is appropriate to establish its policy on construction contingencies.

Funding issues, pending litigation, challenges in acquiring right of way and access to property, and utility relocation, together with the fact that California's high-speed rail program is the first of its kind in North America all suggest that the contingency policy requires a consideration of the particulars of the project as provided by a risk-informed approach as opposed to the blanket application of a standard contingency. This is not intended to imply that the contingency recommendations by other agencies referenced above are insufficient, only that their sufficiency must be verified by a systematic consideration and analysis of the particular project in question.

The identification, quantification and analysis of risks particular to the project, as executed to develop a risk-informed contingency recommendation, provides a supportable, verifiable basis

for the ultimate contingency recommendation that cannot be adequately made otherwise. In addition, the risk informed approach provides a level of transparency to the inputs, process and recommendation that are not provided by employment of standard percentage contingencies.

### Use of Construction Contingencies

Construction contingencies by definition apply to risks that are encountered during the course of construction work. Any delay in processing approval of necessary work can have a serious impact on completion of the construction project on time and on budget.

At the present time Board Resolution #12-24 grants the CEO certain standing authority with respect to A&E contracts, but does not include provisions for the use of construction contingencies. A policy and practice often used by public agencies which deliver public works construction policies is that the CEO or his/her designee have the delegated authority to commit all funds in the established contingency with a requirement that use of the contingency be reported to the Board or the Board committee responsible for monitoring construction activity.

Contract change orders requests submitted by the Contractor or planned to be issued by the Authority are processed in accordance with the requirements in the Contract Special Provisions and the Project and Construction Management Manual. Proposed changes are reviewed by the Authority's Change Control Committee (CCC) for concurrences, and when appropriate recommendation for approval to the CEO will be made. Upon approved, the necessary funds will be transferred to or from the contingency fund.

### Recommendation

It is recommended that the Board adopt the following resolution regarding construction contingencies:

1. Adopt a risk-based, informed approach in determining appropriate levels of contingency
2. Mandate that staff provide to the Audit and Finance Committee for approval a risk-informed contingency assessment report and recommended contingency estimate for every awarded construction package.
3. Authorize the CEO to manage the Audit and Finance Committee's approved contract contingency balance, with required reporting to the Audit and Finance Committee at its regular meetings or upon request, and for the Audit and Finance Committee to provide recurring notification to the Board on contingency trending information.

### Attachments

- Resolution #HSRA 13-20